ACQUIRED HETEROSPECIFICITY WITH BACTERIA

That chemical implantation of tissue specificities takes place in pathogenic bacteria, the ingrafted or induced colloidal factor being hereditarily transmissible in the microbic cells, is a futuristic deduction currently suggested by Holtman[1] of the Ohio State University. If confirmed, this alleged hybridization between bacteria and environmental colloids will have numerous practical applications in diagnosis and therapeutics.

Clinical interest in possible tissue transformations of bacterial specificity was stimulated by Buchbinder,[2] who first suggested the view that the heterospecificity, or "Forssman antigen," demonstrable in certain intestinal bacteria, is not an essential character of these bacteria. The Forssman antigen is conceivably an implanted colloid, acquired as a result of previous contact with Forssman-positive animal tissues. That such ingrafting of an environmental specificity is a biological possibility, had been previously shown by Veblen[3] of Stanford University. The Stanford bacteriologist grew *B. typhosus, S. viridans* and other microorganisms for several generations in 10 per cent horse-serum, and found that microörganisms so grown acquired horse-protein specificity. The ingrafted specificity could not be removed by repeated washings in Ringer's solution, and was retained for at least twelve subcultures in routine culture media. In her hands the twelfth generation subculture was agglutinated by a 1:1000 dilution of antihorse rabbit precipitin, control cultures being nonagglutinated.

In order to test the possibility that the Forssman antigen is an implanted environmental character in certain gastro-intestinal bacteria, Holtman grew Forssman-negative *E. typhosa* and *B. paratyphosus A* on agar containing Forssman-positive material (*e. g.*, horse-serum), with control growths on routine Forssman-negative medium. He also enclosed Forssman-negative bacteria in collodion sacs, which were inserted into the peritoneal cavities of Forssman-positive guinea pigs. After twenty-one days' exposure to such Forssman-positive environments, the bacteria were repeatedly washed in Ringer's solution and planted on routine Forssman-free media. Holtman found that the resulting subcultures were not only Forssman-positive, but continued to form Forssman specificity for at least fifty test-tube subcultures on routine Forssman-negative media. Heat-killed bacteria similarly exposed to a Forssman environment did not acquire Forssman colloids, irremovable by washing.

Following Veblen's lead, Holtman interprets his results as suggestive evidence that Forssman antigen is incorporated in the cytoplasm of the exposed bacteria, and afterward multiplied in symbiosis with these cells. The conventional assumption of an enzymic activation of latent characters in the exposed bacteria was also considered. As a practical application of such chemical implantation, Holtman showed that two widely different bacterial species, grown in the same Forsman-positive media, might each acquire the environmental character in sufficient titer to render the two species indistinguishable from each other by routine serological tests. Whether or not a reversal of the Buchbinder phenomenon, a destruction or removal of a heterophile character in pathogenic bacteria, is a possibility has not yet been investigated. Such removal of a fractional human specificity from pneumococci, for example, might conceivably render the corresponding antiserum nontoxic for human tissues.

P. O. Box 51. W. H. MANWARING,
Stanford University.

1 Holtman, D. Frank: J. Immunol., 36:405, 413 (May), 1939.

2 Buchbinder, L.: Arch. Path. 19:841, 1935.

3 Veblen, Becky B.: Proc. Soc. Exp. Biol. and Med., 27:204, 1929.

PERIPHERAL VASCULAR DISEASES

Major vessel occlusion may be present in spite of a warm extremity. Subjective and objective sensations of warmth in an extremity are determined primarily by the amount and rate of blood flow in the superficial vessels. The surface of the extremity may feel warm to the touch, due to an adequate blood supply through the superficial vessels. The deeper tissues and muscles, however, may be suffering from a definite circulatory deficiency, giving rise to the symptoms of intermittent claudication, and even rest pain.

* * *

Calcification of the arteries, as revealed by the x-ray or palpating finger, is no true indication of the patency of the lumen of the vessel. It indicates one thing only: the presence of arteriosclerosis with calcification of the vessel wall. Calcification is a problem only when there is marked encroachment on the lumen. According to Mann et al.,[1] the internal diameter can be reduced 70 per cent before a 50 per cent reduction in blood flow takes place. The area of the lumen may be reduced 50 per cent without any change in blood flow, and be reduced as much as 90 per cent before a 50 per cent reduction in blood flow occurs. These experiments were on the carotid artery of the dog. Too much importance, however, to the roentgenologic evidence of arterial calcification should not be given. It should be properly evaluated.

* * *

The major peripheral vessels, as the dorsalis pedis and posterior tibial arteries, may be pulsating normally although the patient complains of intermittent claudication, lameness, and other symptoms of vascular deficiency. This is due to the occlusion of the smaller arteries and of the arterioles supplying the muscles of the extremities. The occlusive process can be present anywhere in the arterial system from the larger vessels down to the precapillary arterioles.

* * *

The dorsalis pedis is not palpable in its normal position in approximately 10 per cent of the cases.

1 Mann, F. C., Herrick, J. F., Essex, H. E., and Baldes, E. J.: The Effect on the Blood Flow of Decreasing the Lumen of a Blood Vessel, Surgery, 4:249–252 (Aug.), 1938.

It may curve outward, lying lateral to the line between the middle of the ankle and the back of the first interosseous space. Or it may be completely absent, being replaced by a large anterior peroneal artery. Other locations are possible.

Linear measuring of the circumference of the extremities at selected points is a good policy. Where the circulation is deficient, the tissues will be undernourished and atrophied, with a resultant reduction in circumference. Measurements will aid in checking the results of treatment and progress of the disease. These are much simpler to take than surface temperatures and oscillometer readings, and are very important in the study of the disease.

Some of the presumable symptoms of a vascular disorder—as undue tiredness, sensation of heaviness and early fatiguability in the calves, especially in the male—may be due to the onset of the climacteric. In these cases, substitution therapy may be necessary.

Do not inject or operate on a patient for varicose veins unless you are sure that the deep veins are adequate and that the patient is not suffering from a peripheral vascular disease such as thromboangiitis obliterans.

The majority of patients get better on bed rest. It is the best form of treatment and it is surprising what good results can be obtained by this method.

2007 Wilshire Boulevard.

ROY J. POPKIN,
Los Angeles.

Hemolytic Streptococcic Meningitis Treated with Sulfanilamide.—Ten of twelve patients with hemolytic streptococcic meningitis treated with sulfanilamide recovered, as compared with one of eleven patients treated with specific drugs and serums, spinal drainage, and blood transfusions, John A. Toomey, M. D., and E. Robbins Kimball, Jr., M. D., Cleveland, report in *The Journal of the American Medical Association.*

Hemolytic meningitis is inflammation of a membrane of the brain and spinal cord caused by a streptococcus capable of destroying or dissolving the red blood corpuscles.

Doctors Toomey and Kimball emphasize the fact that sulfanilamide alone may prolong the life of a patient ill with this type of meningitis, but it will not give complete cure if there is an undiscovered focus of infection. In a few cases in which the focus was not recognized immediately, the progress of the disease was held stationary. There was no cure, however, and improvement occurred only when operations eradicating the infection were performed.

The authors have not found it necessary to adopt the more involved methods used by others, but state that their procedures have given as good results. "Our practice," they assert, "has been to give a massive initial dose of the drug (sulfanilamide) followed at once by frequent maintaining doses, to have the patient operated on as soon as possible for removal of the focus of infection and to leave the fluid balance of the spine alone unless the pressure is extremely high."

A total of 102 cases described in recent literature were treated with sulfanilamide or prontosil, or both, and eighty-one of these recovered.

ORIGINAL ARTICLES

SOME INDICATIONS FOR ROENTGEN RAY TREATMENT*

By U. V. PORTMANN, M. D.
Cleveland, Ohio

PART I

THE indications for roentgen ray and radium treatment are innumerable, volumes having been written on this subject. It will be possible in this paper to give only a broad outline of the usefulness and applicability of these methods of treating different pathologic processes and to discuss a few of them specifically.

Many physicians and surgeons have neither the time nor the inclination to peruse radiologic journals. Therefore, they may not be familiar with the advances made in the technical procedures or the most recently proved indications or benefits which may be derived from irradiation for certain diseases, so they must depend for this information upon conference with their radiologist colleagues.

The medical world has become so statistics-minded that sometimes there is skepticism about the benefits of a therapeutic procedure as compared with others, unless mathematical proof substantiates the effectiveness of a newer method advocated. Definite palliative effects and improvements may be brought about in the economic status of patients by certain methods of treatment, but often cannot be calculated by any mathematical formulae. So it is with irradiation, which has proved to be of so great value in the treatment of many pathologic conditions that it no longer needs defense, although sometimes its benefits cannot be measured.

There was a time, not many years ago, when there was confusion in the minds of radiologists and disagreement about the indications or preferences for either roentgen ray or radium in the treatment of various conditions. Differences of opinion lead to progress, however, and experience and experiment prove that both the roentgen ray and radium have their own spheres of usefulness; that the rays have the same physical and biologic effects; that the use of either or both depends largely upon availability, the ease of application, or whether treatment must be given to small or large areas. The biologic reactions to both types of rays depend upon their power to modify or completely destroy cellular functions, according to the quantity and rate of administration. Each may be effectively employed alone for different and similar pathologic conditions, and more often in combination, or sometimes to supplement surgical procedures either before or after operation.

It may be said, in general, that roentgen ray and radium treatment is indicated and useful (1) for some benign tumors; (2) for most malignant tumors; (3) for many acute and chronic inflammatory processes; (4) for certain diseases that have not yet been proved to be either inflammatory or

* Guest Speaker's paper. Read before the third general meeting of the California Medical Association at the sixty-eighth annual session, Del Monte, May 1–4, 1939.